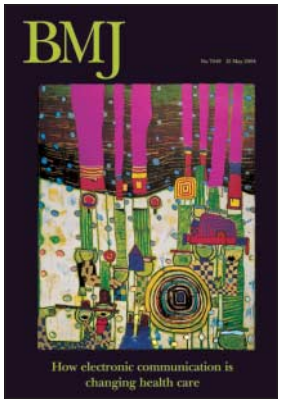
Letters

How electronic communication is changing health care

Usability is main barrier to effective electronic information systems

EDITOR—Jadad and Delamothe celebrate "the return of the human" to health informatics in their editorial asking what's next for electronic communication and health care.[1] The question is not whether we need to merge human centred and technology centred approaches: the question is how to do it.

If electronic resources are to improve health they have to be accessible, reliable, and usable. More than 80% of websites are currently not accessible by all, including most primary care trust and healthcare charity sites.[2] And according to our unpublished in-house survey, few electronic resources are subject to the rigour we would expect of reliable, evidence based publications, and many of the high quality resources that exist are prohibitively difficult to use in everyday practice.



Usability concerns whether an information system is structured so that users can get an answer to fit their purpose. The solution to this problem is user centred design.[3] So why isn't it happening in health care?

In spite of considerable evidence that user centred design results in cost savings downstream, and a clear need to assess the usability of information systems,[4] the perception remains that it is too expensive.

A good first step is the creation of effective, free tools that help us assess the usability of electronic resources quickly, such as our LIDA tool (www.minervation.com/downloads.html). These are needed to show where the problems are in resources that already exist. Once the usability problem has been identified and defined and both users and commissioners have been educated to expect better from information technology systems, momentum will be gathered towards genuinely high quality electronic information systems.

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Competing interests: The authors work for Minervation, a company specialising in accessible, usable, and reliable information resources for health care.

1 Jadad A, Delamothe T. What next for electronic communication and health care? *BMJ* 2004;328:1143-4. (15 May.)
2 Disability Rights Commission. *The web: access and inclusion for disabled people.* London: Stationery Office, 2004. www.drc-gb.org/publicationsandreports/report.asp (accessed 2 Jun 2004).
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Barriers to online learning networks need to be overcome

EDITOR—Russell et al highlight the importance of creating online networks for healthcare professionals to share knowledge in their study of soft networks for bridging the gap between research and practice.[1] However, only a minority of CHAIN members posted messages, and these were apparently to exchange information in response to a "cry for help." There was little evidence of interactive group discussion.

Online group discussions can potentially result in learning and change in practice because this active process allows integration of tacit and explicit knowledge. This has been increasingly recognised with the development of online networks or "communities," such as on the National Electronic Library for Health (NeLH), NHS University, and BMJ Learning websites.

However, in our experience of developing four online networks for a variety of healthcare professionals a high reluctance to engage in meaningful online group discussions prevails. This is despite providing online discussion forums that have been structured to allow ease of posting and replying to messages. The potential of online networks for healthcare professionals will be realised only if barriers to online interaction can understood and overcome.

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1 Russell J, Greenhalgh T, Boynton P, Rigby M. Soft networks for bridging the gap between research and practice: illuminative evaluation of CHAIN. *BMJ* 2003;328:1174. (15 May.)

Patients are e-literate, or not

EDITOR—I agree with Ferguson and Frydman about the various types of e-patients.[1] From current practice, two types of patients emerge: those who are e-literate and those who don't have access to a computer, and if they did they would not have the necessary resources to conduct a search.

E-literate patients are also able to critically appraise or fully understand the information on the screen. Simply put, the computer has now become the item that separates the "haves" from the "have-nots."

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Competing interests: None declared.

1 Ferguson T, Frydman G. The first generation of e-patients. *BMJ* 2004;328:1148-9. (15 May.)

Imagining tomorrow's world stuck in the old paradigm

EDITOR—The theme issue on how electronic communication is changing health care was fascinating, and I agree that one of the characteristics of being in the old world (or paradigm) is that it is almost impossible to imagine the new one.[1]

One of the problems of using computers during a consultation is the negative effect on non-verbal communication. Looking at videos of my consultations with and without computer screens, I see that there is less eye contact, and I might therefore pick up fewer non-verbal cues because of the intrusion of the computer. I have often discussed this problem with other general practitioner trainers and registrars. Various ideas have been suggested, including entering the data at the end of the consultation.

It suddenly occurred to me, maybe we are stuck in the "old paradigm."

Parents are concerned when their children spend hours playing computer games—are they missing out on developing social skills and interacting with others? If you watch children (especially boys) playing these games alongside others they are interacting effectively with each other, although

all their attention (and certainly their gaze) is directed at the screen. Maybe the consultation model of the future will be closer to two children glued to a PlayStation. Both doctor and patient might be focused on the screen, entering data and exploring the net together, possibly involving others, relatives, carers, or specialists at the same time.

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Competing interests: None declared.

1 Smith R. Editor's choice. Can IT lead to radical redesign of health care? *BMJ* 2004;328.0-f. (15 May.)

Handheld computers in clinical practice

Are useful in informing and educating patients …

Editor—Handheld computers have a use in clinical medicine that was not included in the review by Al-Ubaydli[1]: they can be adapted to provide patients with useful information and educational material.

We use colour images held on a personal digital assistant (PDA) during consultations to help patients learn more about their clinical diagnosis and understand the proposed management. We have a library of images, of the normal pelvis and various pathological conditions, that are easily accessible and can be annotated with information relevant to each patient. Any planned surgery can be explained in picture form.

Similarly, we use the same images postoperatively to describe what was found and done during surgery.

Having designed a computer system that can record complete operations in real time (presented at the annual scientific Meeting of the British Society for Gynaecological Endoscopy, Dublin, May 2004), we now routinely capture images during or after surgery (from the recorded movie), downloading them on to the PDA. Rather than showing patients generic images on the postoperative ward round, we show pictures of their own operation. The response of our patients has been universally highly positive.

We have also transferred short, edited movies of surgical procedures to the PDA that can be shown as part of the preoperative counselling process. Few patients have any concept of what their surgery will entail, and we believe that such visual images are far superior to any verbal explanation.

In principle, as with still images, short clips of a patient's own surgery could be downloaded to the PDA.

Local guidelines must be followed when any visual recordings are made of patients. The General Medical Council guidelines state that permission or consent is not required from patients for endoscopic images or images of internal organs, provided that the recordings are effectively anonymised by removal of any identifying marks.

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Competing interests: None declared.

1 Al-Ubaydli M. Handheld computers. *BMJ* 2004; 328: 1181-4. (15 May.)

… and will appeal to new breed of general practitioners

Editor—Our age is electronic whether we like it or not.[1 2] The amount of information available through the internet to both doctors and patients is phenomenal. I have two handheld devices, one operates on Palm and the other Windows CE.

I carry medical information around on these devices that would be impossible to carry in paper form, such as reference books, journals, and software to calculate a patient's body mass index or peak flow rate.

The scope for the use of handhelds is extensive, and because of their size they are much easier to carry around than laptops. Backing up data is very important, and limits to their use depend on people's attitudes to use of computers or electronic devices in general.

Many options are available for most devices, to cater for different uses and preferences. Prices are no longer a barrier, and storage on most devices can be expanded without any problem.

Most of my patients are quite intrigued when I pick the device up to use information on it as reference. Handhelds are widely used in the United States by practising doctors as well as by medical students. I believe that with time these devices are going to be used much more in general practice as the "new breed" of doctors join general practice.

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1 Scheck McAlearney A, Schweikhart SB, Medow MA. Doctors' experience with handheld computers in clinical practice: qualitative study. *BMJ* 2004;328:1162-0. (15 May.)
2 Al-Ubaydli M. Handheld computers. *BMJ* 2004;328:1181-4. (15 May.)

Computer aided prescribing

Software needs to take account of how doctors prescribe

Editor—Ferner's article is a rational appraisal of computer aided prescribing.[1] Such prescribing has great potential but if the software is designed without knowledge of how doctors prescribe it won't be used effectively. The old "garbage in, garbage out" rule still applies.

I receive computer generated letters from pharmacy benefit managers or consultant companies almost daily, telling me what I am doing wrong on the basis of their incorrect data. Last month I was scolded for not giving one of my diabetic patients ramipril (she has been taking it for three years).

I spent my residency years using an electronic record system that flagged almost everything conceivable. For example, prescribing any drug to a patient who had ever been prescribed a wheelchair or a cane produced a warning of a potential unknown interaction between "wheelchair" and "penicillin." Perhaps each user could be allowed to set a certain level for flagging of potential problems, producing "just the right" number of warnings for an individual prescriber. Last month I was scolded by another company's computer for having placed a patient who is taking glyburide on a short tapering course of prednisone—did I know it could affect glycaemic control?

With electronic friends like these, who needs enemies?

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1 Ferner RE. Computer aided prescribing leaves holes in the safety net. *BMJ* 2004;328:1172-3. (15 May.)

Computer aided prescribing is not panacea but can help

Editor—In his review of computer aided prescribing Ferner reminds us that computers are not a panacea for the elimination of error.[1] However, our experience shows that electronic prescribing improves the legibility and completeness of prescriptions[2] and can be tailored to reduce particular prescribing risks.[3]

The perceived safety of computers seems based on interactive alerts. However, interactive alerts can lead to "alert fatigue," causing busy doctors to override alerts because they seem trivial or irrelevant in the clinical context of individual care. In developing interactive rules alerts with the Wolfson Institute in Birmingham we developed the concept of "contextual alerts," which alerted clinicians to possible interactions or contraindications only if a real risk of harm existed.

An example is the alert for an interaction between angiotensin converting enzyme inhibitors and potassium sparing diuretics. Co-prescription of such drugs entails a risk of hyperkalaemia, but most clini-

cians are aware of this and may deliberately co-prescribe, particularly for short term treatment. The alert system we designed identified the potential interaction but only fired an alert if the serum potassium was rising or exceeded predefined limits. If serum potassium concentration had not been monitored for a predefined period of days the alert also fired. This allows patients' safety to be ensured without flooding clinicians with potentially irrelevant alerts.

As Ferner says, no system is completely error free, and we are fortunate to have the safety net of a pharmacist check of prescriptions, which has been shown to reduce error.[4–5]

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Conpeting interests: None declared.

1 Ferner RE. Computer aided prescribing leaves holes in the safety net. *BMJ* 2004;328:1172-3. (15 May.)
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Electronic prescribing is helpful in children too

Editor—We concur with Ferner in his review of computer aided prescribing.[1] Our centre's experience of e-prescribing started in 1996 as part of the overhaul of the clinical management system. Voluntary reporting of prescribing errors was the only mechanism before the introduction of the computer system and was certainly an ineffective way of notification. From our own experience, the prescribing error rate went from an average of 10 per year in 1994 to over 100 per year in 1997, indicating previous underreporting. With proper electronic documentation and monthly clinical audits, we have seen the prescribing error rate reduced to 40 last year (a drop of 60%).

As Farrar et al say in their rapid response (previous letter), we believe that the reduced error rate was due partly to improvement in the legibility and completeness of prescriptions, as well as to the increased awareness of the prescriber to automatic logging. Errors in prescribing may be more likely to occur with a change of junior medical staff every three months, as in our centre. This is even more important in the case of paediatric prescribing, when any wrong dosage may result in detrimental consequence.[2] An informal survey has shown that most junior medical staff working with children welcome the computer system and we therefore have no doubt that the introduction of the electronic prescribing system has been a success.


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1 Ferner RE. Computer aided prescribing leaves holes in the safety net. *BMJ* 2004;328:1172-3. (15 May.)
2 Farrar K, Caldwell N, Robertson J, Roberts W, Power B, Slee A. Use of structured paediatric-prescribing screens to reduce the risk of medication errors in children. *Br J Healthcare Comput Info Manage* 2003;20:25-7.

Decision support needs to be evidence based

Editor—The deficiencies of existing computerised prescribing decision support systems in the United Kingdom described by Fernado et al and Ferner are mirrored in Australia.[1 2] Focus groups conducted by the Australian national prescribing service highlighted concerns that prescribing decision support prompts may not be evidence based or comprehensive.[3]

Subsequently, four prescribing packages were analysed, using the drug records of 20 elderly patients (N Sharma et al, Australian health and medical research congress, Melbourne, November 2002). There were 5-22 recommended drug-drug interaction prompts per patient. These interactions had been categorised by experts as clinically important (for example, ergotamine and erythromycin), clinically appropriate (for example, celecoxib, angiotensin converting enzyme inhibitor, and diuretic), or of low clinical importance (for example, tramadol and warfarin). The appropriateness of the information for a prescriber in general practice was also examined.

Large variations in the total number of prompts, clinical relevance, and appropriateness of the information were found in the prescribing packages. Between eight and 16 of the 32 recommended clinically significant interactions were not detected. Pharmacokinetic interactions were done well. The packages performed poorly in detecting pharmacodynamic and three way drug interactions, therapeutic duplications, when one drug treats an adverse effect induced by another, and promoting rational drug use.

The National Prescribing Service and General Practice Computing Group believes that the development of safe and effective decision support systems requires a formal information model based on an evidence based clinical model, which incorporates the logic and workflow needed to practice safely and effectively. The methods and models, using asthma as an example, and the general practice data model and core data set,[4] are currently being developed (www.healthinformatics.unimelb.edu.au).

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1 Fernado B, Savelyich BSP, Avery AJ, Sheikh A, Bainbridge M, Horsfield P, et al. Prescribing safety features of general practice computer systems: evaluation using simulated test cases. *BMJ* 2004;328:1171-2. (15 May.)
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Amoxicillin for non-severe pneumonia in young children

Stop skimping, start investing in antibiotic treatment

Editor—The limitations of the paper on three *v* five days of antibiotic treatment for pneumonia merit additional emphasis.[1] The paper had an inadequate selection of indicators of treatment failure, an insufficiently discriminating treatment comparison (also pointed out by Borja and Rigau (next letter)), insufficient detailing of patients' history, dismissiveness towards caregivers' assessments, deficient survivor data, and difficulties in applying the conclusion of the study to broader populations.

If the conclusion was acted on, predictable deaths might occur, particularly in undiagnosed asthma. Roughly 54 000 people die in Britain each year from complications related to respiratory infections.

Skimping on antibiotics is a contested tactic. False economy is evident when patients are admitted to hospital and intubated for infections that could have been managed less invasively with appropriate antibiotics.

Skimping does not address the need for a new generation of antibiotics. No one seriously doubts that antibiotics are at times prescribed unnecessarily. But the tokenism is inappropriate, and dangerous skimping is likely to give a false comfort, which displaces the need for real action on the antibiotic problem.

Lobbying governments to support research and development in antibiotics and antiviral medicine and for adjunct changes in public policy is essential. A review of protocols for pharmaceutical approvals is also required, if the necessary developments for the future are to be viable.

Sacrificing people in the name of the species, when the real reason is poor economics, is no longer politically credible. We ought to be particularly sensitive, when it is a vulnerable group such as children, who are called on to make the sacrifice.

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Competing interests: LW conducts public health research in children's policy and practice.

1 ISCAP Study Group. Three day versus five day treatment with amoxicillin for non-severe pneumonia in young children: a multicentre randomised controlled trial. *BMJ* 2004;328:791-7. (3 April.)

Admission to hospital may indicate adverse effects

EDITOR—Some aspects of the clinical trial of the ISCAP Study Group on non-severe pneumonia in young children deserve comment.[1]

Evidence of pneumonia on chest radiography was not an inclusion criterion. In general practice, chest radiography can be considered a pragmatic reference standard for pneumonia.[2] In fact, the study was performed in patients with clinical suspicion of pneumonia but not in patients with pneumonia. The response criteria were not criteria of clinical cure but of impairment. Patients not impaired at three or five days cannot be considered cured. Moreover, the standard duration of treatment with amoxicillin in children with pneumonia is not five days but seven to 10 days.[3] Thus we consider that the three day treatment arm was not compared with standard treatment.

In the section about adverse reactions the authors mention that there were no serious adverse effects of amoxicillin but there were 41 admissions to hospital. We have to consider that any admission was due to an adverse effect of amoxicillin because an adverse effect that leads to hospital admission must be considered serious.[4]

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1 ISCAP Study Group. Three day versus five day treatment with amoxicillin for non-severe pneumonia in young children: a multicentre randomised controlled trial. *BMJ* 2004;328:791-7. (3 April.)
2 Margolis P, Gadomski A. Does this infant have pneumonia? *JAMA* 1998;279:308-13.
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4 Council for International Organisations of Medical Sciences. *Current challenges in pharmacovigilance: pragmatic approaches: report of CIOMS working group V*. Geneva: CIOMS, 2001.

Authors' reply

EDITOR—The need for newer antibiotics must be addressed, but we disagree with Wrennall's other points. Our study was in a low resource setting to identify strategies for improving child health. Data on the appropriate duration of antibiotic treatment for pneumonia in children are scarce. Inappropriate use of antibiotics and increasing antimicrobial resistance are major public health problems. We believe that our results can be applied to a broader population.

Our indicators of treatment failure were stringent. Cases were classified as failed if pulse oximetry results were $<90\%$ on day 3, even if a patient's respiratory rate was below the age specific cut-off point and they would have been called disease free.[1] The sample size estimations were adequate to test equivalence of treatment, and corrections were done for interim analysis.[2] While recruiting cases, we recorded a detailed history and examination. We followed up children for up to 14 days, using pulse oximetry to detect hypoxaemia. For brevity we included only relevant sections in the published paper. We assessed and reported caretakers' attitudes, a strength of our work.

Diagnosed asthma was an exclusion criterion. Children with non-severe pneumonia and wheeze were, however, offered conventional treatment. When the results of this study are applied to wider populations no reason exists to believe that there would be unpredictable deaths among people with undiagnosed asthma. We showed equivalence of three and five days of amoxicillin treatment for non-severe pneumonia, as defined by the World Health Organization's standard case management guidelines for poor settings.

Children are indeed vulnerable, and the investigators, mostly paediatricians, ensured that their benefit was paramount throughout. Ethics committees of all the participating institutions approved the work. None of the study patients died. Forty one children in whom the disease became more severe were admitted to hospital; they received injectable antibiotics and oxygen when required. A similar study has been conducted in Pakistan.[3]

Although we did not use chest radiography to diagnose pneumonia, we followed the WHO's clinical case definition of ambulatory pneumonia for managing pneumonia in countries with an infant mortality of more than 40 per 1000 births.[4] Given the extent of pneumonia in communities with low resources, it is impractical and expensive to perform chest radiography in all children with suspected pneumonia. Even if chest radiography were used in all the patients as part of the study, the results could not be generalised to other low resource settings, where pneumonia is not diagnosed by chest radiography. Moreover, chest radiography may not change the outcome of pneumonia in ambulatory patients.[5]

We compared the five with the three day regimen because the WHO case management guidelines recommend antibiotic treatment for five days.[4] Although the British Thoracic Society's guidelines cited by Borja and Rigau recommend seven days' antibiotic therapy, they mention a lack of empirical data for appropriate duration of treatment.

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1 WHO Memorandum. Clinical management of acute respiratory infections in children. *Bull WHO* 1981;59: 707-16.
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Reduce door to needle, not door to balloon, times first

EDITOR—Primary angioplasty may well prove to be the gold standard for treatment of ST elevation myocardial infarctions in the future, as Smith advocates,[1] but for the moment I foresee many factors against angioplasty. This is especially highlighted in the Isle of Wight, the main factor being the postcode lottery.

Studies with an average door to balloon time of 1 hour and 56 minutes were conducted in the United States, where distances to centres that can perform angioplasties can be quite different from those in the United Kingdom. Additionally, the Isle of Wight is unique because a vehicle ferry is required to transport patients to a tertiary referral centre. Door to balloon times are hence significantly greater than 1 hour as the crossing itself is 55 minutes alone.

I cannot see angioplasties ever becoming the gold standard until primary angioplasty centres are developed in district general hospitals. It requires time, money, and investment in angiography skills and laboratories: something the NHS perhaps lacks?

In the interim period, surely the way forward is to reduce door to needle times, with pre-hospital thrombolysis a more practical approach?

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Competing interests: None declared.

1 Smith D. Primary angioplasty should be first line treatment for acute myocardial infarction: FOR. *BMJ* 2004;328:1254-6. (22 May.)

Sexuality of health practitioners is complex

EDITOR—Riordan's qualitative study of how gay and lesbian health professionals manage issues such as physical examinations is interesting and provocative.[1] However, there has long been evidence that sexual orientation occurs, like most human characteristics, on a spectrum.[2] Although there may be clustering at each end of this spectrum, most people report at least some heterosexual and homosexual responsiveness.

This is seen most clearly in same sex institutions and in soldiers' behaviour in wartime settings. The extent to which people

cluster at either end of the spectrum might be determined by factors such as social acceptability, political views, and the legal status of gay and lesbian lifestyles. In countries such as the United Kingdom many health professionals who regard themselves as gay or lesbian will have reflected on these issues. However, what about the much larger number of men and women who may experience arousal to other people of the same sex but are living to all intents and purposes as heterosexuals? These professionals may be most vulnerable in clinical settings.

Although an obvious solution is to recommend chaperones for all physical examinations, this only addresses one narrow part of the problem and is not always possible, particularly in primary care. In his accompanying editorial Hughes calls for further research, but perhaps this should be aimed at all healthcare workers (not just gay men and lesbians), for many of whom this matter may be relevant.[3]

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1 Riordan DC. Interaction strategies of lesbian, gay, and bisexual healthcare practitioners in the clinical examination of patients: qualitative study. *BMJ* 2004;328:1227-9. (22 May.)
2 Kinsey AC Pomeroy WB, Martin CE. *Sexual behaviour in the human male.* Saunders, Philadelphia, 1948.
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Implementing guidance on hip fracture

Advice is misleading

Editor—Dr Foster's case notes by Bottle et al quote the Scottish Intercollegiate Guidelines Network (SIGN) recommendation that patients with fractured neck of femur are operated on as soon as possible, ideally within 48 hours after admission.[1]

Patients with femoral neck fracture who are fit on admission are usually operated on early. Those who are not have their medical conditions treated and a later operation. The fit group do better than the unfit group, hence time to operation merely reflects general fitness on admission. The timing of operation does not itself cause the difference in mortality.

In a study performed in Newcastle all patients who were fit enough, or could be made fit enough, were treated surgically.[2] A point was made of treating concurrent medical problems, particularly dehydration and chest infection before operation was undertaken. The overall six month mortality of the group was 17%, and the six month mortality of the group operated on was 9.6%. Our mortality figures compare favourably with the literature on mortality after femoral neck fracture.

From our study the key to success seems to be, maximise the patient's general condition first, and operate as soon as possible thereafter. This is generally what happens anyway, and the resulting figures for mortality viewed against time of operation, inevitably follow from this policy.

We found that mortality after femoral neck fracture is most heavily influenced by the mental ability of the patient at the time of admission. Comparisons of mortality after femoral neck fracture not taking mental test score into account are unhelpful.

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Competing interests: None declared.

1 Bottle B, Jarman B, Aylin P, Taylor R. Some way to go for consistent implementation of guidance on hip fracture. *BMJ* 2004;328:1097. (8 May.)
2 Ions GK, Stevens J. Prediction of survival in patients with femoral neck fractures. *J Bone Joint Surg Br* 1987;69:384-7.

Authors' reply

Editor—We agree with Ions that the stabilisation of medical problems is the main reason for delaying surgery on patients with a fractured neck of femur, and that comorbidities, particularly dementia, are important predictors of death. However, we disagree with the view that the timing of the operation is in itself unimportant.

Although a Swedish study of 274 patients found no effect of delaying the operation once the patient had been stabilised, two other studies found that delay increased the risk of death and morbidity and the length of stay even in physiologically stable patients.[1–3] Further analyses on our own data for all English NHS hospitals show that, for patients aged 65 and older and admitted from their own homes, even after adjusting for the effects of socioeconomic deprivation, age, sex, and comorbidity, operative delay is associated with a higher risk of death. This was found for all in-hospital deaths and for in-hospital deaths within 30 days of admission.

Nationally, 17% patients waited more than 48 hours for surgery, but trust level figures ranged from 0 to 72% (16% at Newcastle). Such swingeing variations between trusts are unlikely to be entirely due to case mix factors such as differing mental test scores, especially as we excluded patients admitted from residential or nursing homes. This implies that further investigation is required.

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Public health programmes: you don't know what you've got till it's gone

Editor—In 2005 a new inspection regimen will be launched in the British NHS: public health programmes will have to prove that they are providing good value for taxpayers' money.[1] The Swedish Institute for Infectious Disease Control was recently publicly criticised by the National Board of Health and Welfare because nearly 70 African immigrants became infected with Mycobacterium tuberculosis.[2] Similar events are occurring in many countries around the world.

All governmental institutions should document their efficiency, but most Western countries have observed a dramatic decline in infectious diseases, increase in life expectancy, and improved health services in the past decades. These data should provide such documentation. When a disease is practically eradicated from a society it is easy to forget that efforts are also needed to prevent its re-emergence. To prove that public health programmes are the reason why people did not become ill in the previous year is difficult. However, neglect of well-known public health principles fuelled the global tuberculosis epidemic and is why WHO declared tuberculosis a global health emergency in 1993.[3] Dengue viruses were seen again in Brazil because the programme that had eradicated the vector in the 1960s could not be sustained.[4] Tuberculosis, malaria, cholera, meningococcal disease, Ebola, yellow fever etc, are endemic in countries unable to sustain public health programmes such as are established in industrialised countries.[5]

An ideal public health programme should not allow for any diseases to occur within a society. The cost effectiveness of such a hypothetical programme cannot be proved in traditional ways because improvement can no longer be obtained. There are, however, numerous examples where financial cutbacks in national health systems have led to re-emergence of different diseases.

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